

NEW CALCAREOUS NANNOFOSSIL TAXA FROM THE LOWER CRETACEOUS OF THE NORTH SEA

Martin Jakubowski, Robertson Research International Ltd., Llandudno, Gwynedd North Wales, U.K.

During the investigation of several well sections from the Moray Firth Basin of the North Sea a number of new species were discovered. A new genus, five new species and four new combinations are described. The samples were examined from released well sections under light and scanning electron microscopes. All holotypes and paratypes are light and electron microscope negatives and are deposited at Robertson Research (Llandudno), except for the holotype of *Eprolithus varolii* which is deposited at British Petroleum's Research Laboratory.

GENUS: *Crucibiscutum* gen. nov.

Type species: *Cruciplacolithus salebrosus* BLACK (1971)

Diagnosis: Small elliptical coccoliths consisting of two shields made up of imbricating elements. The central area is spanned by a cross which is orientated along the principal axes of the ellipse. The distal shield, which is slightly larger, is connected to the proximal shield via a central tube.

Remarks: This new genus has been erected to accommodate the species *Cruciplacolithus salebrosus* BLACK (1971) and *Cruciplacolithus hayi* BLACK (1973) which cannot easily be placed into any existing genera. The Tertiary genus *Cruciplacolithus* HAY and MOHLER (1967) has two cycles in the proximal shield whereas *Crucibiscutum* has only one. *Crucibiscutum* differs from *Biscutum* BLACK (1959) by having an axial cross in the central area instead of an imperforate central area filled with granules. It can be separated from *Palaeopontosphaera* NOEL (1965), which possesses only a transverse bar in the central area, through which passes an axial canal. Finally, it differs from *Sollasites* BLACK (1967) which has a crossbar in the short axis but also has several crossbars parallel or subparallel to the long axis of the ellipse. The following new combinations are introduced.

*Crucibiscutum salebrosum* (BLACK, 1971) JAKUBOWSKI, nov. comb. plate 1, figs. 16-17.

1971 *Cruciplacolithus salebrosus* BLACK, 1971, p. 379; plate 30, fig. 4.

*Crucibiscutum hayi* (BLACK, 1973) JAKUBOWSKI, nov. comb.

1973 *Cruciplacolithus hayi* BLACK, 1973 p. 66; plate 23, figs. 9-10.

GENUS: *Eprolithus* STOVER (1966).

*Eprolithus varolii* JAKUBOWSKI nov. sp., plate 1, figs. 1, 10-11.

Diagnosis: A species of *Eprolithus* with a thin wall composed of 16-20 segments and a broad central diaphragm. The segments of the wall are twisted and separated into two halves by the disc shaped diaphragm, which consists of 16-20 thin, wedge shaped, non-imbricating elements. These elements do not meet at the centre due to the presence of a small circular aperture.

Remarks: This species differs from *Lithastrinus septentrionalis* STRADNER (1963)

by the presence of a wide diaphragm, two layers of twisted wall segments and, in cross-section, by the H-shaped outline. It differs from *Eprolithus antiquus* PERCH-NIELSEN (1979) which has 10 wall segments and from *Eprolithus apertior* BLACK (1973) and *Eprolithus floralis* (STRADNER, 1962) STOVER (1966) which have only 9 wall segments.

Holotype: Neg. no. B.P./Pal. 2891; plate 1, fig. 1.

Paratype: Neg. no. MJ/06/85/14-15; plate 1, figs. 10-11.

Type locality: Otto Gott, near Hamburg, West Germany.

Type level: *nutfielensis* ammonite Zone, upper Aptian.

Range: Upper Barremian to Aptian.

GENUS: *Gartnerago* BUKRY (1969).

*Gartnerago praeobliquum* JAKUBOWSKI nov. sp., plate 1, figs. 2-3, 12-13.

Diagnosis: A species of *Gartnerago* in which the central area is divided into 4 quadrants by an axial cross. Each of the 4 bars making up the axial cross terminates at the margin of the central area in a flaring 'arrowhead' and is divided into 2 halves by a central suture. Under the light microscope the species has a characteristic bright, outer cycle visible under both phase contrast and cross-polarized light, as is typical of the genus *Gartnerago*.

Remarks: This species is distinguished from other members of the genus *Gartnerago* by possessing flaring, 'arrowhead' terminations to the axial cross and a central area with four open quadrants.

Holotype: Neg. no. MJ/N2/18-19; plate 1, figs. 2-3

Paratype: Neg. no. MJ/06/85/8-9; plate 1, figs. 12-13.

Type locality: Moray Firth Basin, North Sea.

Type level: *Gartnerago praeobliquum* Zone, upper Albian.

Range: Lower - upper Albian.

*Gartnerago theta* (BLACK, 1959) JAKUBOWSKI nov. comb., plate 1, figs. 14-15.

1959 *Discolithus theta* BLACK in BLACK AND BARNES, 1959, p. 327; plate 12, fig. 1.

Remarks: This species possesses a characteristic *Gartnerago* shield structure including the bright outer cycle of elements visible under the light microscope. The central area is divided into 2 halves by a single transverse bar. In well preserved specimens the central area either side of the transverse bar displays perforations and a suture parallel to the long axis.

Range: Albian to Cenomanian.

GENUS: *Lithraphidites* DEFLANDRE (1963).

*Lithraphidites moray-firthensis* JAKUBOWSKI nov. sp., plate 1, figs. 4-5, 8-9.

Diagnosis: A species of *Lithraphidites* which is characterised by four keels which are truncated at both ends and taper inwards toward a central tooth which appears bright under cross-polarized light.

Remarks: The distinctive tapering of each keel towards a single central tooth distinguishes *Lithraphidites moray-firthensis* from other keeled species of *Lithraphidites*, such as *Lithraphidites grossopectinatus* BUKRY (1969) which has a row of four teeth and from *Lithraphidites quadratus* BRAMLETTE AND MARTINI (1964) and *Lithraphidites praequadratus* ROTH (1978) which do not possess any teeth.

Holotype: Neg. no. MJ/S2/21; plate 1, fig. 8.

Paratypes: Neg. no. MJ/S2/15; plate 1, fig. 9.

Neg. no. MJ/06/85/24-25; plate 1, figs. 4-5.

Type locality: Moray Firth Basin, North Sea.

Type level: *Lithraphidites moray-firthensis* Zone, lower Aptian.

Range: Upper Barremian to lower Aptian.

GENUS: *Micrantholithus* DEFLANDRE (1954)

*Micrantholithus brevis* JAKUBOWSKI nov. sp., plate 1, figs. 6-7.

Diagnosis: A species of *Micrantholithus* where the free side of each segment tapers inwards, very slightly, to form one positive angle and two shallow negative angles.

Remarks: *Micrantholithus brevis* differs from the closely related *Micrantholithus speetonensis* PERCH-NIELSEN (1979) by possessing much shallower negative angles and a much lower positive angle. It also does not possess the very wide black bands that run parallel to the sutures separating the segments, which are visible in *Micrantholithus speetonensis* under cross-polarized light. *Micrantholithus brevis* provides an obvious evolutionary link between *Micrantholithus speetonensis* and *Micrantholithus obtusus* STRADNER (1963) (see plate 1, fig. 27).

Holotype: Neg. no. MJ/08/85/35-36; plate 1, figs. 6-7.

Type locality: Moray Firth Basin, North Sea.

Type level: *Micrantholithus speetonensis* Zone, lower Valanginian.

Range: Lower Valanginian.

GENUS: *Phanulithus* WIND AND WISE (1977).

*Phanulithus anfractus* JAKUBOWSKI nov. sp., plate 1, figs. 20-23.

Diagnosis: An elliptical coccolith constructed of four segments in different crystallographic orientation exhibiting a moderately high birefringence. A short, shallow, S-shaped suture separates the 2 segments which lie about the short axis. The two remaining segments, which are positioned at the ends of the ellipse, are separated from those on the short axis by deeply incised, zigzag sutures.

Remarks: *Phanulithus anfractus* differs from all previously described species of *Phanulithus* by possessing curved and zigzag sutures.

Holotype: Neg. no. MJ/04/85/30-31; plate 1, figs. 20-21.

Paratype: Neg. no. MJ/01/85/11-12; plate 1, figs. 22-23.

Type locality: Moray Firth Basin, North Sea.

Type level: *Phanulithus anfractus* Zone, upper Albian to lower Cenomanian.

Range: Upper Albian to lower Cenomanian.

GENUS: *Conusphaera* TREJO (1969).

*Conusphaera rothii* (THIERSTEIN, 1971) JAKUBOWSKI nov. comb., plate 1, figs. 24-26.

1971 *Cretaturbella rothii* THIERSTEIN, 1971, p. 483; plate 3, figs. 1-5.

Remarks: This species has often been placed in synonymy with *Conusphaera mexicana* TREJO (1969) (plate 1, figs. 28-29). However, it differs markedly in possessing a shorter cone, consisting of inclined twisted plates which, in the light microscope, produce a characteristic cross-hatching along the long axis. *Conusphaera mexicana* has a much longer cone which does not possess any twisted plates; they are straight and parallel to the sides of the cone.

#### ACKNOWLEDGEMENTS

I would like to thank the directors and management of Robertson Research International Ltd. for their support and financial assistance. I am also greatly indebted to Dr Jason Crux (B.P. Research Centre) for providing scanning electron micrographs of *Eprolithus varolii* and to Dr Osman Varol and Dr Magdy Girgis (Robertson Research) for their valuable and much appreciated help and advice.

#### REFERENCES

- BLACK, M., 1967. New names for some coccolith taxa. *Proc. geol. Soc.*, no. 1640, 139-45.
- BLACK, M., 1971. Coccoliths of the Speeton Clay and Sutterby Marl. *Proc. Yorkshire geol. Soc.*, 38(3), 381-424.
- BLACK, M., 1972, 1973, 1975. British Lower Cretaceous coccoliths. I. Gault Clay. 1,2,3. *Monogr. palaeontogr. Soc. London*, 126, 1-48; 127, 49-112; 129, 113-42.

- BLACK, M. and BARNES, 1959. The structure of coccoliths from the English Chalk. *Geol. Mag.*, 96, 321-8.
- BRAMLETTE, M.N. and MARTINI, E., 1964. The great change in calcareous nannoplankton fossils between the Maestrichtian and Danian. *Micropalaeontology*, 10, 291-322.
- BUKRY, D., 1969. Upper Cretaceous coccoliths from Texas and Europe. *Univ. Kansas Paleontol. Contrib.*, 51 (Protista 2), 1-79.
- DEFLANDRE, G., 1959. Sur les nannofossiles calcaires et leur systématique. *Rev. Micropaleontol.*, 2, 127-52.
- DEFLANDRE, G., 1963. Sur les Microrhabdulidés, famille nouvelle de nannofossiles calcaires. *C.r. Seances Acad. Sci. Paris*, 256, 3484-6.
- DEFLANDRE, G. and FERT, C., 1954. Observations sur les Cocclithophoridés actuels et fossiles en microscopie ordinaire et électronique. *Ann. Paleontol.*, 40, 115-76.
- HAY, W.W. and MOHLER, H.P., 1967. Calcareous nannoplankton from early Tertiary rocks at Pont Labau, France, and Paleocene - Eocene correlations. *J. Paleontol.*, 41, 1505-41.
- JAKUBOWSKI, M. (in press). A proposed Lower Cretaceous nannofossil zonation scheme for the Moray Firth area of the North Sea. *Jb. Geol. B.-A.*
- NOEL, D., 1965. Sur les Coccolithes de Jurassique Européen et d'Afrique de Nord. *Edition du CNRS Paris*, 209 pp.
- PERCH-NIELSEN, K., 1979. Calcareous nannofossils from the Cretaceous between the North Sea and the Mediterranean. *IUGS Series A*, 6, 223-72.
- ROTH, P.H., 1978. Cretaceous nannoplankton biostratigraphy and oceanography of the Northwestern Atlantic Ocean. *Initial Rep. Deep Sea drill. Proj.*, 44, 731-59.
- SISSINGH, W., 1977. Biostratigraphy of Cretaceous calcareous nannoplankton. *Geol. Mijnbouw.*, 56(1), 37-65.
- STOVER, L.E., 1966. Cretaceous coccoliths and associated nannofossils from France and the Netherlands. *Micropaleontology*, 12, 133-67.
- STRADNER, H., 1962. Über neue und wenig bekannte Nannofossilien aus Kreide und Alttertiär. *Verh. geol. Bundesanst. (Wien)*, 1962, 363-77.
- STRADNER, H., 1963. New contributions to Mesozoic stratigraphy by means of nannofossils. *Proceedings of the 6th World Petrol. Congr. Sect. 1*, paper 4 (preprint), 1-16.
- THIERSTEIN, H.R., 1971. Tentative Lower Cretaceous nannoplankton zonation. *Eclog. geol. Helv.*, 64, 459-88.
- TREJO, M., 1969. *Conusphaera mexicana*, un nuevo coccolitoforido del Jurassico Superior de Mexico. *Revista Inst. Mexicano Petrol.*, 1(4), 5-15.
- WISE, S.W. Jr. and WIND, F.H., 1977. Mesozoic and Cenozoic calcareous nannofossils recovered by DSDP Leg 36 drilling on the Falkland Plateau, SW Atlantic sector of the Southern Ocean. *Initial Rep. Deep Sea drill. Proj.*, 36, 296-309.

SAN MIGUEL, M.(1977).- Contribución al estudio de los Discoasteridos. Bol.R. Soc.Esp.Hist.Nat. 75(1-4), 115-165

STRADNER, H.(1973).- Catalogue of Calcareous Nannoplankton from sediments of Neogene age in the Eastern North Atlantic and Mediterranean Sea. In: W.B.F. RYAN, K.J. HSU, et al. Init. Rep. DSDP, 13(II), 1137-1199

THEODORIDIS, S.A.(1983).- On the legitimacy of the generic name Discoaster TAN, 1927 ex TAN, 1931. INA newsl. 5(1), 15-21

-- (1984).- Calcareous nannofossil biozonation of the Miocene and revision of the Helicoliths and Discoasters. Utrecht Micro-pal. Bull. 32, 1-271

+++++

UFO 3: A nannofossil found in the middle Eocene from the Aquitaine Basin, S.W. France.

by Catherine Mancion  
6, Square Léon Blum, 92800 Puteaux, France.

Tiny nannofossil, possibly barrel-shaped, with a circular, 5.3 $\mu$  wide basal disc consisting of 24 elements arranged in a subradial manner. The disc is gently depressed over 2/3 of its area. The structure of its center is unclear due to preservation. The side view was not observed but the lateral wall appears to be formed of overlapping plates.

Location: Found in middle Eocene blue marls exposed in the Miretrain Quarry (Aquitaine basin). The nannofossil assemblage found in these marls includes *Chiasmolithus gigas*, *Discoaster martinii*, *Nannotetrina cristata*, *N. fulgens* and *Rhabdosphaera gladius* and is diagnostic of Zone NP 15. The planctonic foraminifera indicate the *Globigerinatheka subconglobata subconglobata* Zone of Bolli (1957, 1966).

+++++

PLATE 1

M. Jakubowski: New calcareous nannofossil taxa from the Lower Cretaceous of the North Sea.

Figs. 1, 10-11: *Eprolithus varolii* JAKUBOWSKI nov. sp.

Fig. 1: Holotype, B.P./Pal 2891; side view, x 10000; Sample 06 57, Otto Gott.

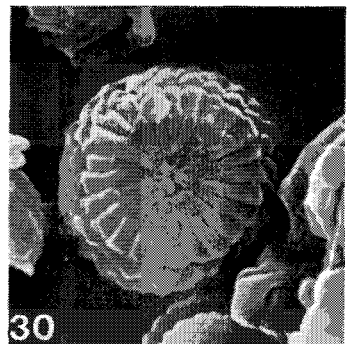
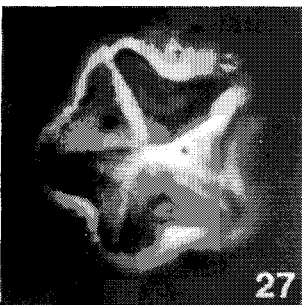
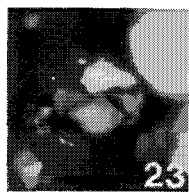
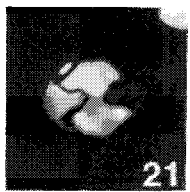
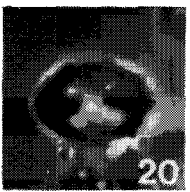
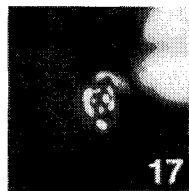
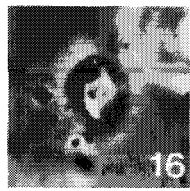
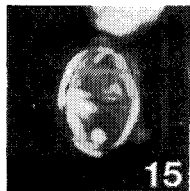
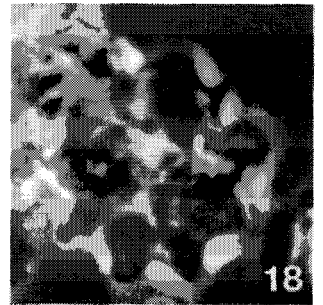
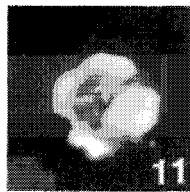
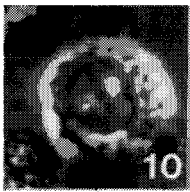
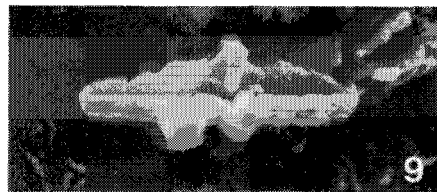
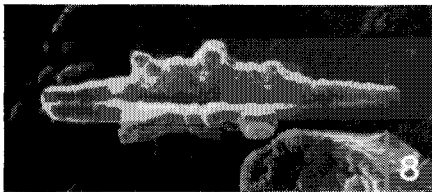
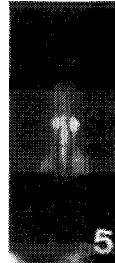
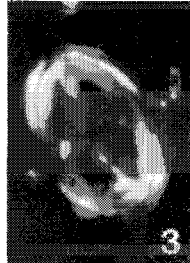
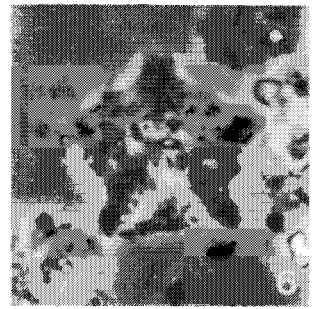
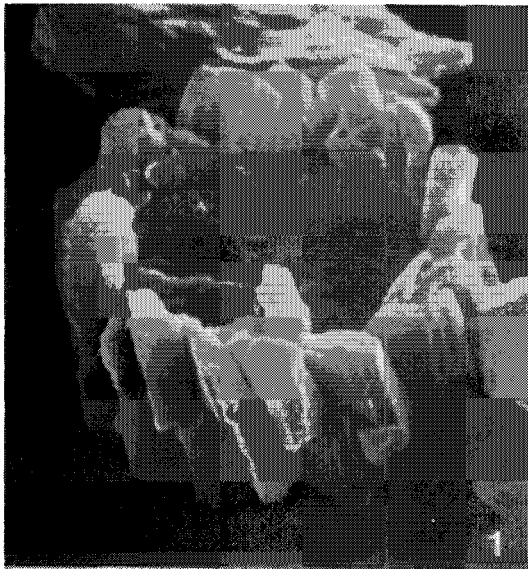
Figs. 10-11: Paratype, MJ/06/85/14-15; Fig.10, phase contrast. Fig.11, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 6720'.

Figs. 2-3, 12-13: *Gartnerago praeobliquum* JAKUBOWSKI nov. sp.

Figs. 2-3: Holotype, MJ/N2/18-19; Fig.2, phase contrast, Fig.3, cross-polarized light, x 2400; Sample Occidental 13/28-1, 4780'.

Figs. 12-13: Paratype, MJ/06/85/8-9; Fig.12, phase contrast, Fig. 13, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 7040'.

# PLATE I



(PLATE 1, cont.)

- Figs. 4-5, 8-9: *Lithraphidites moray-firthenensis* JAKUBOWSKI nov. sp.  
Fig. 8: Holotype, MJ/S2/21; side view, x 5800; Sample B.P. 14/4-1, 1320m.  
Fig. 9: Paratype, MJ/S2?15; side view, x 5800; Sample B.P. 14/4-1, 1320m.  
Figs. 4-5: Paratype, MJ/06/85/24-25; Fig.4, phase contrast, Fig.5, cross-polarized light, x 2400; Sample B.P. 14/4-1, 1320m.
- Figs. 6-7: *Micrantholithus brevis* JAKUBOWSKI nov. sp.  
Holotype, MJ/08/85/35-36, Sample B.P. 14/4-1, 1685.5m, x 2400; Fig.6, phase contrast, Fig.7, cross-polarized light.
- Figs. 14-15: *Gartnerago theta* (BLACK, 1959) JAKUBOWSKI nov. comb.  
Sample Sun Oil 20/7-A1, 5990', x 2400; Fig.14, phase contrast, Fig.15, cross-polarized light.
- Figs. 16-17: *Crucibiscutum salebrosum* (BLACK, 1971) JAKUBOWSKI nov. comb.  
Sample S-19, x 2400; Fig.16, phase contrast, Fig.17, cross-polarized light.
- Figs. 18-19: *Micrantholithus speetonensis* PERCH-NIELSEN 1979; Sample B.P. 14/4-1, 1660m, x 2400; Fig.18, phase contrast, Fig.15, cross-polarized light.
- Figs. 20-23: *Phanulithus anfractus* JAKUBOWSKI nov. sp.  
Figs. 20-21: Holotype, MJ/04/85/30-31; Fig.20, phase contrast, Fig.21, cross-polarized light, x 2400; Sample Texaco 15/16-5, 11420'.  
Figs. 22-23: Paratype, MJ/01/85/11-12; Fig.22, phase contrast, Fig.23, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 6200'.
- Figs. 24-26: *Conusphaera rothii* (THIERSTEIN, 1971) JAKUBOWSKI nov. comb.  
Sample Sun Oil 20/7-A1, 7400', x 2400; Fig.24, phase contrast, Figs.25-26, cross-polarized light.
- Fig. 27: *Micrantholithus obtusus* STRADNER, 1963; Sample Nettleton AF-1, x 2400, phase contrast.
- Figs. 28-29: *Conusphaera mexicana* TREJO, 1969; Sample East Madagascar well, x 2400; Fig.28, phase contrast, Fig.29 cross-polarized light.

---

C. Mancion: UFO 3: A nannofossil found in the middle Eocene from the Aquitaine Basin, S.W. France.

Fig. 30: UFO 3, 4500 x.